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ABSTRACT

Tech prep was created to serve high school students in the two middle quartiles who neither prepare for further study nor gain adequate technical workplace skills by blending liberal and practical arts into a 2+2 secondary-postsecondary articulated curriculum leading to an associate degree. Tech prep is a cornerstone of the Carl D. Perkins Vocational and Technology Act Amendments of 1990, the first major federal initiative promoting comprehensive, sustained links between secondary and two-year college sectors. In addition, the American Association of Community and Junior Colleges (AACJC) has offered Tech Prep/Associate Degree (TPAD) Program Partnership Awards since 1990 to community colleges for the development of articulated curricula involving the colleges, local secondary schools, and employers. The optimal high school tech prep academic portion of the curriculum contains two years of principles of technology and/or another applied science, two years of applied math, and a course in applied communication. Although tracking the program's success has been difficult due to the recency of its creation, TPAD seems to be a win-win alternative to the college prep/baccalaureate degree course of study because it improves student academic performance, high school graduation rates, and college attendance at the associate degree level. As an unanticipated outgrowth of TPAD, some 2+2 tracks have evolved beyond the associate degree into articulated 2+2+2 programs culminating in a baccalaureate degree. (MAB)

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In *The Neglected Majority*, Parnell (1985) maintained that students in the two middle high school quartiles neither prepare for nor aspire to baccalaureate study. Instead, they leave high school without education or training suited to an increasingly sophisticated technological workplace. Parnell conceived of tech prep as an articulated high school/community or technical college program of formalized studies to reach the "neglected majority" by integrating the 11th through 14th year of occupational-technical curricula. In essence, he proposed making tech prep a new and different college prep track. Blending the liberal and practical arts, it would run parallel to the historic academic track but lead to an associate rather than a baccalaureate degree (Hull, 1991).

Tech prep became virtually a national community college mission statement during and after Parnell's tenure as president of the American Association of Junior and Community Colleges (AACJC). In its 1989 *Joint Policy Statement on Federal Relations*, the AACJC urged the federal government to give "as much emphasis to technical education and critical skill needs as to academic and research pursuits." The Association lobbied aggressively for supplemental financial support to "enhance technical education programs with emphasis on assisting individuals to attain basic literacy, math competency, critical thinking, and responsibility skills." One of the ways suggested by the AACJC for improving technical education was through incentive grants for the development of 2 + 2 articulated curriculum in technical education.

Today, tech prep is a cornerstone of the Carl D. Perkins Vocational and Technology Act Amendments of 1990 (Hull and Parnell, 1991). It represents the first major federal initiative promoting comprehensive, sustained links between secondary and two-year college sectors. Federal financial backing for this approach to 2 + 2 secondary-postsecondary articulation is $63.4 million for FY'91, $90 million for '92, and $104.16 million for '93. Local and state support also grows. North Carolina, for example, is planning to expand the TPAD program to all public school and community college service areas to increase the percentage of high school graduates (*Community College Week*, 1/20/92, p. 4). A 1989 national survey of two-year institutions found 37% of respondents involved already in 2 + 2 tech prep programs (National Council for Occupational Education, 1989).

Since 1990, the AACJC has offered TPAD Program Partnership Awards to community colleges for the development of articulated curricula involving the colleges, local secondary schools, and employers. The criteria listed in the Awards Committee's *Characteristics of Excellence in Tech Prep Programs* (1991) include the following:

...coordinated curricula that emphasize as outcomes enhanced skills that would not be possible if secondary and postsecondary curricula were followed separately;
...curricular modification at both the secondary and postsecondary levels;
...emphasis on enriched applied instruction in mathematics, science, communication, and technology principles at the secondary level; and
...sustained, documented effectiveness.

Applied Academics

As one outcome for secondary/postsecondary tech prep programs, the Perkins legislation specifies achievement of academic competence in mathematics, science, and communications to be acquired, in part, through applied academics. Hull (1991) calls applied academics the foundation for technical careers requiring academic skills to adapt to an ever-changing technological workplace. Pedrotti and Parks (1991) define applied academics as the integration of a common core of applied math, science, and communications with immediate work-force applications. Like other advocates of tech prep, they maintain that "'hand skill'" and "'head '" skill learning (p. 70) reinforce each other and promote conceptual understandings transferable to new situations.

According to Pedrotti and Parks (1991), the optimal high school tech prep academic portion of the curriculum contains two years of principles of technology (applied physics) and/or another applied science, two years of applied math, and a course in applied communications. Principles of technology is one of four widely used secondary-level modularized applied academics courses developed with financial support from the State Directors of Vocational Education; it devotes about 50 percent of class time to realistic problem-solving in laboratory contexts. Applied math contains three hands-on lab activities for each of its 36 modules stressing data gathering and analysis. The video-based applied communications course teaches communication and English language skills relative to the workplace. (For course descriptions, see Pedrotti and Parks, pp. 63-85; Bottoms, pp. 380-95; and Hull and Parnell, Appendix B, pp. 364-80, 1991).

TPAD proponents argue that application-rich courses like business letter writing and business math can be made

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academically rigorous while requiring actual skills demonstration (Parnell, 1992). Advocates like Pedrotti and Parks encourage the extension of the secondary school applied academics concept into postsecondary education through, for example, emphasizing technical math and/or technical communications in place of more traditional college courses.

To illustrate, TPAD chemical technology students at Community College of Rhode Island follow an articulated curriculum that includes algebra and trigonometry for technology courses as well as modern technical physics. Electronic engineering technology students take technical math but regular college physics (Mamaras and Neri, 1992). However, these students still also take regular college composition, social science, and other general education courses, raising the question of how well their experience with the applied approach to general learning prepares them for the more abstract and theoretical reasoning required in traditional arts and science work.

Academic Outcomes

According to its literature, tech prep is a win-win alternative to the college prep/baccalaureate degree course of study. It is deemed to improve academic performance, high school graduation rates, and college attendance at the associate degree level. Given its recency, however, tracking the program's effectiveness is difficult (Bryant, 1992).

In promoting improved math, science, and communications competencies for high school graduates through applied academics, Bottoms (1991) acknowledges the need to upgrade vocational course academic content and to set performance indicators for academic achievement in vocational programs. Evaluators need to ask how well the high school's applied emphases in science, math, and communications prepare graduates for that part of the community college's liberal arts and science education outside of the TPAD model. In light of the national movement towards higher education outcomes assessment, evaluators also need to validate that applied variants of liberal arts and science courses help students attain college-level communications, quantitative, and analytic skills.

As an unanticipated outgrowth of TPAD, some 2 + 2 tracks have evolved beyond the associate degree into articulated 2 + 2 + 2 programs culminating in the baccalaureate. The latter range from a home economics program involving Rowland High School, Mt. San Antonio Community College, and California State University at Long Beach (Stanley, Morse, and Kellett, 1992) to an engineering technology program linking five high schools, Portland Community College, and the Oregon Institute of Technology (Hata, 1990). One of the original tenets of tech prep was the sufficiency of the associate degree to prepare those uninterested in and unprepared for baccalaureate study for entry-level mid-range technical occupations like nursing, engineering technology, or banking and insurance. Evidently, TPAD graduates do transfer into baccalaureate degree programs, articulated and unarticulated. Therefore, evaluators also need to ask how well applied academics variants of traditional college writing, mathematics, and science courses prepare students for transfer to senior institutions.

Tech Prep Revisited

Despite its wide support, some question the academic merits of the TPAD approach. Bryant (1992) would revisit tech prep to better focus it upon programs requiring a higher degree of technical skill. DiCroce (1989) would revisit tech prep for formulating too narrow a role for the sector in higher education. Rendon (1992) would reexamine tech prep as a pathway to the associate degree that appears to diminish access to the bachelor's, especially for students of color. In the end, however, the concept of tech prep may have to give way to workplace realities requiring continuing education through the baccalaureate for most mid-range technical fields. If so, pressure to create 2 + 2 + 2 programs articulated to the 2 + 2 TPAD may truly test the TPAD's capacity to meet the academic expectations of the four-year degree.

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